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<b>(21) International Application Number:</b> PCT/US99/29666 <b>(22) International Filing Date:</b> 13 December 1999 (13.12.99) <b>(30) Priority Data:</b> 60/114,371 30 December 1998 (30.12.98) US <b>(63) Related by Continuation (CON) or Continuation-in-Part (CIP) to Earlier Application</b> US 60/114,371 (CON) Filed on 30 December 1998 (30.12.98) <b>(71) Applicant (for all designated States except US):</b> THE REGENTS OF THE UNIVERSITY OF MICHIGAN [US/US]; Technology Management Office, The University of Michigan, Wolverine Tower, Room 2071, 3003 South State Street, Ann Arbor, MI 48109-1280 (US). <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> YANG, Ralph, T. [US/US]; 2627 Pin Oak Drive, Ann Arbor, MI 48103 (US). HUTSON, Nick, D. [US/US]; 1139 Wendy Court, Ann Arbor, MI 48103 (US).		<b>(74) Agents:</b> DESCHERE, Linda, M. et al.; Young & Basile, P.C., Suite 624, 3001 West Big Beaver Road, Troy, MI 48084-3107 (US). <b>(81) Designated States:</b> AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG). <b>Published</b> <i>With international search report.</i>

**(54) Title:** LITHIUM-BASED ZEOLITES CONTAINING SILVER AND COPPER AND USE THEREOF FOR SELECTIVE ADSORPTION

**(57) Abstract**

The invention provides new methods for separating nitrogen from a mixture. The invention provides adsorbents specifically for accomplishing nitrogen separation. The adsorbents and separation methods are particularly useful for the selective adsorption of nitrogen from air. In one aspect, the adsorbent comprises an ion exchange zeolite X and preferably zeolite LSX (low silica zeolite X). The zeolite is most preferably a lithium-based zeolite. Further, the zeolite has exchangeable cationic sites, with silver cation or copper cation occupying at least some of the exchangeable cationic sites. The Ag/Cu exchanged zeolite is heat-treated under specific conditions as per the invention. The presence of the silver cation or copper cation at any of the sites will provide an improvement over the non-exchanged zeolite.